

USS FRANKLIN D. ROOSEVELT
CVB / CVA/ CV-42

❖ Manufacturers of the following machinery and equipment were identified in the Material Inspection Report dated 6/7/1949:

4-HP Turbines	General Electric
4-LP Turbines	General Electric
#1-Distiller Circulating Pump	Warren
#1-Brine Overboard Pump	Warren
#1-Evaporator Feed Pump	Warren
#2-Fuel Oil Service Pump	DeLaval
#3-Fuel Oil Booster & Transfer Pump	DeLaval
#3-Emergency Feed Pump	Warren
#2-Auxiliary Feed Booster Pump	Worthington
#2-Fresh Water Pump	Worthington
#3-Lubricating Oil Pump	DeLaval
#4-Main Circulator Pump	Worthington
#3-Main Feed Pump (Turbine Driven)	Worthington
#3- Main Feed Pump Turbine	Moore
#4-Main Feed Booster Pump	Worthington
#5-Bilge Pump	Worthington
#10-Fire and Flushing Pump (Motor Driven)	Worthington
#1-Fire and Flushing Pump (Turbine Driven)	Warren
#1-Driving Unit	Sturtevant
#4-Cooling Water Pump	Worthington
#10-Refrigerator Circulator Pump	Warren

#3-Main Condensate Pump	Worthington
2-LP Air Compressors	Worthington
2-MP Air Compressors	Worthington
2-HP Air Compressors	Hardie-Tynes
12-Boilers	Babcock & Wilcox
24-Forced Draft Blowers (Turbine Driven)	Sturtevant
4-Distilling Plants	Griscom-Russell
8-Ship's Service Generator Turbines	General Electric

- ❖ Manufacturers of the following machinery and equipment were identified in the Material Inspection Report dated 12/14-18/1953. Although some of the manufacturers have been identified above, they are included here for further confirmation.

4-HP Turbines	General Electric
4-LP Turbines	General Electric
2-LP Air Compressors	Worthington
2-MP Air Compressors	Worthington
2-HP Air Compressors	Hardie-Tynes
12-Boilers	Babcock & Wilcox
24-Forced Draft Blowers (Turbine Driven)	Sturtevant
4-Distilling Plants	Griscom-Russell
8-Ship's Service Generator Turbines	General Electric

- ❖ Manufacturers of the following equipment and machinery were identified in the attached ship-specific documentation:

11-Hydraulic Variable Speed Pumps	Vickers
Main Feed Pumps	Worthington

Salt Water Booster Pump	Warren
Fuel Oil Pumps	DeLaval
Main Condensers	Foster Wheeler ¹
Gland Exhaust Condenser	Foster Wheeler ¹
Auxiliary Machinery Cooling Pump	Warren
Distiller Condenser Circulating Pump	Warren
Distiller Condenser Condensate Pump	Warren
Distiller Fresh Water Pump	Warren
Evaporator Feed Pump	Warren
Evaporator Brine Overboard Pump	Warren
1 st Effect Tube Nest Drain Pump	Warren
Lube Oil Heater	General Electric

¹ General Electric-contractor

REPORT OF MATERIAL INSPECTION

OF

U.S.S. FRANKLIN D. ROOSEVELT (CVB-42)

HELD 7 June 1949

BY

BOARD OF INSPECTION AND SURVEY

Original to: Chief of Naval Operations
Via: Bureau of Ships

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OPNAV-45-108 (REV. 1-48)

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A-9687

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2. The Board made a careful inspection of the U.S.S. FRANKLIN D. ROOSEVELT (CVB-42) and was assisted by Captain H.D. Felt, USN, the Commanding Officer and other Officers attached to the vessel.

II - GENERAL COMMENT

1. The USS FRANKLIN D. ROOSEVELT (CVB-42) is a 968 foot overall, 136 foot beam, 56566 (optimum battle condition), 62000 (full load displacement) 4 screw, 212,000 SHP, Aircraft Carrier constructed by New York Naval Shipyard at Brooklyn, New York, preliminarily accepted 26 April 1945 and first commissioned 27 October 1945 at the New York Naval Shipyard, Brooklyn, New York.

2. The USS FRANKLIN D. ROOSEVELT departed from the United States on a shakedown cruise to the Caribbean Area in January 1946 and returned to the United States in March 1946. From March to July 1946 the vessel conducted various exercises along the Atlantic Coast and in the Caribbean. From 22 July to 2 August 1946 the vessel conducted Standardization Trials off Guantanamo Bay, Cuba.

From 8 August to 4 October 1946 the vessel was assigned to the Twelfth Fleet in the Mediterranean area.

From 1 February 1947 to 13 September 1948 the vessel operated off the Atlantic Coast and in the Caribbean Area as a unit of the Eighth Fleet. During this period the vessel also had a major overhaul. (See below).

From 13 September 1948 to 23 January 1949 the vessel was assigned to the Sixth Task Fleet in the Mediterranean Area.

From 21 February to 21 March 1949 the vessel was assigned to the Second Task Fleet in the Caribbean Area.

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From 11 April 1949 to 24 May the vessel operated off the Atlantic Coast as a unit of the Second Task Fleet and Task Force 89.

3. The USS FRANKLIN D. ROOSEVELT (CVB-42) suffered no battle damage. The ship was last overhauled at the Norfolk Naval Shipyard from 15 April 1947 to 15 June 1948 and was last drydocked from 6 December 1947 to 10 January 1948 in the same shipyard. The ship is due for next overhaul at the Norfolk Naval Shipyard in February 1950.

III - OPERATIONS --- EQUIPMENT, INSTALLATIONS AND SPACES

(a) NAVIGATION

Pilot
House

Pilot house was well maintained and properly equipped, with adequate visibility through ports ahead and abeam. Visibility was impaired by windows and other objects on open bridge. Access was through 7/8 inch doors which are unhandy to open and close. There were four loudspeakers installed, two of them too close together for good discrimination. There was a ship control console, with separate engine telegraphs. A variable course clock was installed. It is reportedly awkward to use.

Open
Bridge

This station was fully equipped with windows and a heavy weather screen that is portable, but not readily removable. Chart desk was installed.

Secondary
Conn

This was an armored station with adequate instruments under forward edge of flight deck.

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V - MACHINERY INSTALLATION

General

1. The general condition of the Machinery and Boilers of the USS FRANKLIN D. ROOSEVELT (CVB-42) taking into account operations and age was good. Blueprints pertaining to all Machinery units in this department were approximately 98% complete. Instruction books covering the operation and maintenance of these units were 100% complete. Items of both categories were indexed and systematically filed in the Engineers Log Room.

The Machinery Index was up to date on the old form and will be transferred to the new form upon receipt of model forms from the USS MIDWAY.

The Machinery History and Engineers Log were up to date and complete with all prescribed entries. The condition sheet submitted to the Board, however, was lacking in numerous important entries.

The last inventory of Machinery Spares was conducted in March 1949. The Board was informed that the status of these items was 95% complete and on board at that time. Requisitions covering the indicated shortages were subsequently prepared and submitted.

The last recorded full power run was accomplished without casualty or penalty on 30 August 1948, during which time a speed of 31.9 knots was attained with an average of 203.3 RPM on all shafts.

The last major Machinery Overhaul was performed by the Norfolk Naval Shipyard during the period 14 April to 15 June 1947 inclusive.

Main
Engines

2. The main engines of the USS FRANKLIN D. ROOSEVELT consist of four sets of cross-compound General Electric turbines developing a total of 212,000 SHP

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at 565 p.s.i. steam pressure and 825° F steam temperature.

Inspected No. 2 low pressure turbine. The last stage row of ahead blading was found intact with blades smooth at the entry and exit edges. Slight roughness appeared on the blade surfaces. Shroud bands were clear and were free from abrasion or distortion at the inner edges. The last row astern was also inspected and found in satisfactory condition. The blades rang clear when tapped with a hammer handle. All internal casing bolts were satisfactorily secured by wire lacing. Two stay bolts were tested by hammer tapping and a clear distinct ring was obtained. Tube erosion on condenser tubes beneath the exhaust stages contained only a light surface erosion. A moderate amount of moisture was found in the interior of the No. 2 turbine due to leaking stop valves in the auxiliary exhaust line. A clearance reading at the after astern plot taken at the time of inspection was found to read .281 $\frac{1}{2}$. The forward clearance of the astern element last row was found to be .078 $\frac{1}{2}$. Three stay rods in the forward end were tested and found tight. All blading had good color and contained no roughness or erosion. The last thrust reading taken on this turbine indicated a clearance of .014. The thrust was not open for this inspection. The journal of the after bearing of No. 2 low pressure turbine showed practically no grooving. Alternate bands of black and silver color were observed. A 180° recessed fillet marked the end of the journal surface and was estimated to be about $\frac{1}{8}$ " radius. The shaft contained slight surface corrosion. The deflector ring indicated no deformation or rubbing contact. The lining of the top babbitt cap had a good gray color and contained no steel inclusions. Clearance under the oil fins measured .0125 on the starboard side and .018 on the port side. The distance from the collar to the

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edge of the bearing shell measured .524 on the starboard side and .522 on the port side. Pin gauge readings taken November 1948 were reported to read 8.609 versus an established constant of 8.603. A check reading obtained in June 1949 showed close conformity to the November reading with a value of 8.608. The coupling tooth clearance of the side of the top tube measured .016 on one side and .003 on the other giving a total clearance in the static condition of .019.

Inspected the forward bearing of No. 2 high pressure turbine. The journal was in excellent condition with no grooving over .002 in depth. The condensate slinger ring was intact. The oil fins had produced a slight roughness on the mating shaft surfaces and had cut into the carbonized oil surface. The journal was joined to the shaft with a 180° recess fillet. The thrust bearing of this turbine contained a smooth surface on the forward side. A forward shoe showed a 50% burnished contact with light circumferential grooving. The after thrust collar was smooth. No. 12 after shoe showed a 90% burnished contact with slight circumferential grooving. No. 7 after shoe showed 85% contact. The general condition of this thrust bearing is considered excellent. The measurements from the shaft collar to the bearing assembly measured 0.392 on the port side and .400 on the starboard side. The movable clearance indicator requires refitting at the point of contact. The shifting of the marking plate as based on first stage clearances may be sufficient. While .008 difference is indicated in the shaft collar to bearing housing dimensions the top cap showed no significant askew markings due to any marked misalignment. At the after end of this turbine the oil fins being made of aluminum alloy material scribed no significant marking on shaft surfaces to establish the differential movement of rotor and casing. Oil fins at

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the horizontal joints measured .020 on the star-board side and .015 on the port. The view through the first stage peep hole of this high pressure turbine indicated no defects. The shroud bands and two tenons as visible appeared to be satisfactory. At the high pressure stage the clearance from nozzle to blade measured and found to be .056. The after coupling at the high pressure turbine showed an unusual forward movement beyond its established setting and was measured to be approximately 5/16" forward. The forward ring was approximately 15/16 forward from the after edge. Drawings indicated total permissible float of about 58/64. Interior surfaces were clean and bright with no rust in evidence. This unusual shifting of the coupling unit to the maximum forward position should be watched from time to time and check measurements taken to insure satisfactory operation. The high pressure nozzle valve stems were in good condition with no leakage reported. Throttle linkage and controls showed no excessive lost motion. The relief valve on the low pressure cross-over line should be fitted with a protective bonnet and a leak-off line to bilge to prevent possible injury to personnel. This valve contains no manufacturer's name and is a rather poor product to install on this system.

Inspected No. 3 low pressure turbine. The forward thrust collar surface was smooth but not polished. One forward shoe was removed and indicated a 50% burnished contact with slight circumferential grooving of .002 to .003 in depth near the outer edge. The after shoes could not be removed for inspection but the collar was found smooth. A thrust clearance as determined on June 6, 1949 measured .013. The design requirements for this clearance is .007 minimum and .020 maximum.

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Pin gauge readings for this bearing on June 2, 1949 showed an actual value of 8.5825 versus an established constant of 8.5825. On the date of inspection the clearance at the forward end of the astern elements measured .079. A similar clearance value at the after stage measured .284. The interior blading of the turbine as could be seen from inspection openings was intact and the shroud blades were undamaged. Two stay rods were hammer tested and found tight. A moderate erosion existed on condenser tubes. This turbine interior contained considerable moisture due to leaky auxiliary exhaust stop valves. The after bearing of this unit was not open. On 2 June 1949 the pin gauge reading for the after bearing measured 8.626 versus a constant of 8.624. The coupling was inspected at the after bearing. Some surface rust was noted due to a steam leakage flow as drawn into the gear box. A tooth clearance of .008 on each side was measured at the top tooth in a static condition.

Inspected No. 3 high pressure turbine. The shroud band and two tenons as sighted through the first stage clearance hole appeared to be satisfactory. A clearance of .047 was found to exist at this point between shroud and nozzle. Pin gauge readings on March 9, 1949 were found to be 8.610 and on 2 June 1949 8.616 compared to an established constant of 8.610. This of itself would indicate a bearing drop of .006. The clearance or rotor position gauge on the forward end of this unit requires renewal of the contact arm and necessary adjustment. Inspected the after bearing of No. 3 high pressure turbine. The journal had alternate bands of dark and silver color. The pin gauge readings for this bearing on 2 June 1949 were found to be 6.098 versus an established constant of the same value. Bridge gauge readings at this time on the journal were .017 at the top and .018 at the side. The babbitt cap was satisfactory except that

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~~XXXXXX~~ several small steel particles were imbedded in the forward end of the babbit lining. These will be removed by ship's force prior to re-assembly. The journal was fitted with a 180° recess fillet. Condensate slinger ring was intact. Clearance under the oil fins was measured to .015 on both port and starboard sides. The distance from the shaft collar to the bearing housing was measured and found to be .269 to the port and .257 to starboard side. This discrepancy of .012 in alignment should be watched for heating and askew contact. No difficulties have been reported to date. The forward edge of the coupling connected to the gear was displaced forward 5/16" from the edge which is the normal operating position. Coupling tooth clearance at the top tooth measured .016 on one side and .003 on the other side. A total clearance of .019 exists in this coupling.

Inspected the journal of the forward bearing of No. 4 high pressure turbine. The journal had a smooth polished surface with grooving not exceeding .002. The top babbit cap contained two small steel inclusions but was otherwise in good condition. Except for lining surfaces this bearing appeared to be smooth and uniform. A welding repair had been made on the surface of this cover. The thrust indicator should be set to an established neutral point. Thrust collar was smooth forward. No. 2 shoe contained light circumferential grooving and about 40% burnished contact area. The after collar surface of this thrust was dead smooth. No. 6 shoe which was removed showed a burnished contact area of 25% and contained only negligible grooving. A casing crack was welded by the Norfolk Naval Shipyard in March 1948. This crack was about 2" long and had not leaked since that time. The oil fin clearance measured at the horizontal joints was found to be .012 on both sides. The distance from collar to bearing housing was measured as .266 on both sides. The last pin gauge reading on 27 April was found to be 8.587 versus a constant

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of 8.582. Again some downward wear has occurred. A factor to consider is the small diameter spindles on the Brown and Shapre depth gauges which are used for this purpose. The spindles are too small and easily bent and their finger adjustment requires careful adjustment to obtain accuracy. It is recommended that a heavier micrometer depth gauge be used for this purpose. The coupling to the reduction gear was inspected. A tooth clearance of .012 on one side and .002 on the other indicated a total clearance .014 on the coupling teeth. A check measurement of the high pressure turbine first stage from shroud edge to nozzle resulted in a clearance value of .042.

Inspected No. 4 low pressure turbine. The after bearing journal showed alternate dark and light areas and several .003 grooves throughout its length. A slight relief should be provided at a rubbing surface of the cap near the forward port edge. The shaft surfaces were slightly grooved from oil retaining fins. The width of marking on the shaft measured to be approximately .125 with a .014 edge on the oil fin or indicating relative motion between rotor and casing of .111. This reading should not be interpreted as very accurate as the aluminum fins do not produce a definitive mark. At the forward journal of this turbine a slight discoloration was noted on the journal but it is not believed due to any overheating. A .002 groove existed at the after end and a .004 groove at the forward end. The babbit cap requires some relieving in the after end near the horizontal joints. The thrust collar was smooth. The forward shoe was removed and found to have negligible grooving and 85% burnished contact. A second forward shoe was found to be in excellent condition with 85% burnished contact. The after collar surface was smooth although the after shoes could not be removed. They were, however, satisfactory as revealed by an edge inspection. The interior of

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the turbine disclosed rather heavy sweating and moisture although no steam vapor was in evidence at the time of the inspection. Internal bolts were properly wired. The last row of ahead blading and shrouds were found clear. The entry and exit edges of the blading were smooth with no perceptible roughness. Three stay rods were hammer tested and found tight. All blades gave a clear metallic ring when tapped with a hammer handle. The after clearance on the astern elements was measured and found to be .275. At the forward bearing the distance from collar to babbitt shell was found to be .489 on one side and .491 on the other. It was reported by ship's force that the after journal of this turbine was .250 under normal diameter. This journal had apparently been damaged in shipment during the construction period and was cut down at the New York Navy Yard and the bearings machined to suit this altered dimension. On the second day of the inspection the lower half of the fwd. bearing of No. 4 low pressure was rolled out. A good contact was found. An included angle of about 100° bearing surface was observed. Eight metallic steel pieces were found near the forward edge of the bottom half which had produced grooving to the depth of about .005 of the journal. Further inspection of the thrust bearing indicated 90% contact on the forward shoes and about 95% contact on an after shoes. One after shoe had a small ridge cut by steel particles near the center of its radius. No corrective work is believed necessary at this time.

No. 1 main engine room was in a stand-by condition and only a partial and surface inspection was conducted in this space. A top bridge gauge reading of .0145 versus a constants of .012 was measured on the No. 1 high pressure turbine after bearing. At the same time a side clearance of .018 $\frac{1}{2}$ was measured versus a constant of .024 to the side. Last pin gauge readings taken March 10, 1949 indicated an actual value of 8.581 versus a

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constant of 8.579. Clearances were taken on the first row of No. 1 high pressure and a clearance reading of .044 was obtained. The shroud bands were clean and bright and the 2 tenons visible were intact. The thrust indicator on No. 1 low pressure forward bearing was found in satisfactory condition. Pin gauge readings on the after low pressure bearing was found to be 8.622 versus a constant of 8.618. No difficulties were reported with the main engines in this space.

The following table indicates bridge gauge readings on all units as found within recent dates and as taken by the Board. This compilation indicates gaps where additional bridge gauge readings should be taken. These have been indicated in the table and comprise the forward bearing of No. 1 low pressure, the after bearing of No. 1 low pressure, the after bearing of No. 2 low pressure, the forward bearing of No. 3 high pressure, the forward bearing of No. 3 low pressure, the after bearing of No. 3 low pressure, and the forward bearing of the No. 4 low pressure. This last bearing should be rebabbitted if subsequent measurements disclose the .006 drop which is now indicated and if wear continues.

BRIDGE GAGE READINGS

<u>TURBINE</u>	<u>BEARING</u>	<u>CONSTANT</u>	<u>READING</u>	<u>UP OR DOWN</u>	<u>DATE</u>
#1 HP	FWD	.023	.025	.002	9/10/47
#1 HP	AFT	.012	.0145	.0025	3/10/49
#1 LP	FWD	.013	.014	.001	9/8/47
(TAKE BRIDGE RDGS.)					
#1 LP	AFT	.019	.016	.003	9/8/47
(TAKE BRIDGE RDGS.)					
#2 HP	FWD	.036	.036	.000	8/10/47
#2 HP	AFT	.024	.025	.001	8/10/47
#2 LP	FWD	.013	.014	.001	8/12/47
#2 HP	AFT	.025	.027	.002	8/12/47

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eliminate this interior rusting and corrosion should be provided. In general, the main engines were well cared for, carefully operated, and satisfactory operation has been obtained from this main propulsion plant.

Main
Reduction
Gears

3. Each shaft is provided with a multiple pinion double reduction gear as manufactured by the General Electric Co.

Inspected No. 2 Main Reduction Gear. The forward helix on the low pressure side of the intermediate indicated a good uniform band contact on the driving faces. No sharp edges and no stress concentrations were observed at the tooth ends. The after helix of this intermediate was also in good condition. The upper intermediate on the low pressure side showed ground glass markings but no foreign material lines and excellent contact. The pinion while not too accessible for sighting indicated no deficiencies. The forward helix of the upper low speed pinion had no significant markings, no foreign material lines, and no unusual stress indications. On the high pressure side the forward helix of the upper and lower intermediates were inspected and found satisfactory. The forward helix of the high pressure pinion of forward edge had a burnished pad contact about half way up to the addendum. This should be watched for further stress concentration. The same condition exists at the after end. The lower low speed pinion showed no significant markings. Ship's force reported that this reduction gear operated satisfactorily in service. A maximum temperature of 174°F. has been attained on bearing No. 20, the high pressure center pinion with oil out of the cooler at 115°F. After normal speed is reached this bearing usually attains a temperature of 168°F. Shaft locking device consists of about an 8" drum with a split cast iron surface. The handwheel is fairly convenient but not too accessible for emergency use.

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Inspected No. 3 reduction gear. The high pressure high speed pinion on the after helix showed some pin point spalling. The lower low speed pinion contained no significant markings. The upper low speed pinion on the high pressure side showed slight particle spalling. The bronze turning gear worm was inspected and was found in excellent condition with practically no evidences of wear. On the low pressure side the lower intermediate pinion showed slight roughness on the driving faces of the after helix. On inspecting this gear it was observed that a salt-water cooler for vapor condensation was installed on each unit. Salt water lines are now disconnected. However, no atmospheric relief is provided except as existing from a small drain line. It is recommended that this salt water cooling system be eliminated and removed from the ship and that a screened vent to atmosphere be installed. A breathing and venting device of adequate cross-sectional area should prove beneficial to these gears.

Inspected No. 4 main reduction gear. No significant defects were noted on the high pressure side on the lower intermediate. The upper intermediate and the high speed pinion at the after helix showed slightly more wear than other comparable gears. Light pin point markings 2" from the after end of the after helix were observed. On the forward helix of the bull gear about 3½" from the after end recessed markings from foreign material were noted. These were about 1½" long. Contact surfaces have been satisfactorily dressed down. Corresponding markings were noted on the upper and lower low speed pinions. The after helix of the bull gear showed some oxide coloring. It was reported that No. 10 bearing, the after bearing of the low speed pinion, reached about 160° maximum temperature at full power with oil out of the lubricating oil cooler at 120°F. The after helix

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of the upper low speed pinion showed some particle spalling and a ground glass finish. The lower intermediate on the low pressure side showed a slight material line $2\frac{1}{2}$ " from the forward end of the after helix. The first reduction train as visible from inspection openings was found to be in good condition. The thrust enclosure of No. 4 gear was opened for inspection. Provision for mounting a thrust bearing is provided in this enclosure.

No. 1 main reduction gear was not open for inspection but was reported to be in satisfactory material and operating condition by the ship's force.

In general, main reduction gears showed relatively few markings, erosion, spalling or scuffing. No unusual stress concentrations were noted and rust was practically absent. Perhaps this good condition may be attributed to the enclosed cycle of venting reduction gear casing vapors. If this design should be tenable, further study of gear ventilation may be profitable. The normal venting of the casing to atmosphere has however proven satisfactory in the majority of marine reduction gear installations. The reduction gears are considered to be satisfactory for full power operation and performance.

Lubrication 4. All components of the Main Turbine and Reduction Gear lubrication systems were in good material condition. Examination of the lubricant during inspection of the Main Lubricating Oil Strainers disclosed no apparent emulsification, or suspended foreign matter and indicated viscosity within prescribed limits. A slight amount of coagulated paint flakes and lint, however, appeared in the bottoms of strainer baskets.

Pertinent data contained in the report of chemical analysis by the laboratory of the Norfolk Naval Shipyard, dated 1 June 1949 was as follows:

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The sample marked: Oil, Lube, Symbol 2190T, (1) #1 Main Eng., (2) #1A Turbo Gen., (3) #1B Turbo Gen., (4) #2 Main Eng., (5) #2A Turbo Gen., (6) #2B Turbo Gen. Rec'd. 5/26/49.

	(1)	(2)	(3)	(4)	(5)	(6)
*Viscosity @ 130°F. -----	194	187	193	194	193	194
Flash Point, °F. -----	440	410	420	440	410	420
Neutralization Number ---	0.05	0.08	0.05	0.05	0.05	0.05
Water, % by Volume, -----	Trace	0.05	None	None	Trace	None
Sediment, % by Volume ---	None	None	None	None	Trace	None

*Required viscosity for new lube oil N. S. 2190-T is 185-205 S.S.U. @ 130°F.

The sample marked: Oil, Lube, Symbol 2190T, (7) #3 Main Eng., (8) #3A Turbo Gen., (9) #3B Turbo Gen., (10) #4 Main Eng., (11) #4A Turbo Gen., (12) #4B Turbo Gen.

	(7)	(8)	(9)	(10)	(11)	(12)
*Viscosity @ 130°F. -----	194	189	192	193	193	191
Flash Point, °F. -----	440	425	440	440	425	425
Neutralization Number ---	0.05	0.08	0.05	0.05	0.05	0.05
Water, % by volume -----	Trace	0.05	0.10	Trace	None	0.01
Sediment, % by volume -----	None	None	None	Trace	None	Trace

*Required viscosity for new lube oil N. S. 2190-T is 185-205 S.S.U. @ 130°F.

Shafting
and
Propellers

5. Although in board tail shaft and line shaft sections were in good material condition some slight inactive rust was present on exposed surfaces of the former, particularly on flanges. Stern glands were tight but were lightly coated with verdigris. The caps of #9 Spring Bearing of #2 Shaft, #3 Spring Bearing of #3 Shaft and #1 Spring Bearing of #4 Shaft were lifted for inspection.

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No deficiencies were noted in the condition of the shaft contact surfaces or bearing white metal at these points. Although the internal parts of #1, #2, #3 and #4 Main Thrusts were inaccessible for examination; reports indicated these as being in good condition.

Stern tubes, outboard tail shaft sections, strut bearings and propellers were not examined inasmuch as the vessel was waterborne. Stern tube and strut bearing clearances recorded at the last docking were as follows:

	#1	#2	#3	#4
Stern Tube	.090"	.080"	.085"	.075"
Intermediate Strut	.070"	.100"	.100"	.103"
Main Strut	.124"	.121"	.130"	.100"

Propellers are of the three bladed type serially numbered 13534, 11209, 11208 and 13535 respectively from starboard to port.

Condensers 6. The four main condensers were open for inspection and were found to be clean and in good condition no defects noted. Auxiliary condensers No. 2A, No. 2B, No. 3A and No. 3B were open for inspection, and found to be in good condition.

Pumps 7. There were eighteen pumps opened to facilitate examination of internal parts by the Board. The classifications, types and condition of the individual units opened, were as follows:

(a) #1 Distiller Circulator, "Warren", volute; heavy erosion on impeller vanes, wearing ring seats and wearing rings.

(b) #1 Brine Overboard Pump, "Warren", vertical, centrifugal; excessive wearing ring clearance.

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(c) #1 Evaporator Feed Pump, "Warren", centrifugal; heavy erosion on impeller vanes and discs.

(d) #2(c) Fuel Oil Service Pump, "DeLaval", gear; satisfactory.

(e) #3 Fuel Oil Booster and Transfer Pump, "DeLaval", gear; satisfactory.

(f) #3(c) Emergency Feed Pump, "Warren", vertical, simplex; slight pitting in steam cylinder bore, steam piston rings worn, water cylinder bore deeply scored, water piston with follower plate deeply scored.

(g) #2 Auxiliary Feed Booster Pump, "Worthington", 2 stage, vertical, centrifugal; satisfactory.

(h) #2 Fresh Water (Potable) Pump, "Worthington" centrifugal; satisfactory.

(i) #3(A) Lubricating Oil Pump, "DeLaval", gear; satisfactory.

(j) #4 Main Circulator, "Worthington", axial flow propeller type; guide bearing bolts badly deteriorated from rust to such an extent as to require renewal.

(k) #3(B) Main Feed Pump, "Worthington", 2 stage centrifugal, "Moore" 2 stage turbine drive; turbine bucket blading worn from steam erosion.

(l) #4(B) Main Feed Booster Pump, "Worthington", 2 stage, vertical, centrifugal; satisfactory.

(m) #5 Bilge Pump, "Worthington", vertical, simplex; satisfactory.

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(n) #10 Electric Fire and Flushing Pump, "Worthington" centrifugal; wearing rings and seats eroded and pitted, impeller vanes ragged from erosion, one sand hole in impeller disc from imperfect casting, shaft sleeves deeply grooved from packing abrasion.

(o) #1 Steam Fire and Flushing Pump, "Warren" centrifugal, "Sturtevant" turbine drive; heavy rust and steam erosion on turbine bucket blading, excessive wearing ring clearance.

(p) #4 Cooling Water pump, "Worthington", centrifugal, wearing rings and seats worn to such an extent as to be useless.

(q) #10 Refrigerator Circulator, "Warren", centrifugal; slight erosion on impeller vanes.

(r) #3(A) Main Condensate Pump, "Worthington", vertical, 2 stage, centrifugal; slight erosion on first stage impeller vanes, deep pitting on impeller discs, excessive wear on thrust bearing causing normal coupling gap of $\frac{1}{4}$ " to increase to $\frac{5}{16}$ ".

Piping,
Valves,
Fittings

8. Material of this category was generally in good material condition with a very few exceptions. These exceptions were as follows:

(a) Four 150# Auxiliary Steam Valves were leaking.

(b) One 12' section of contaminated oil drainage piping in #1 Engine Room was corroded to such an extent as to require renewal.

(c) One 7' 6" section of Auxiliary Machinery water service line in #3 Pump Room bore numerous patches covering perforations.

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(d) The water service lines in #1, #2, #3 and #4 Shaft Alleys for Stern Tubes, spring bearings and thrust lubricating oil coolers were generally deteriorated to such an extent from galvanic action that renewal was necessary.

Air
Compressors

9. This equipment consists of two "Worthington" 2 stage L.P. units, two "Worthington" 2 stage H.P. units and two "Hardy-Tynes" four stage HP units.

#2 LP unit and #2 HP unit were open for examination of internal parts. Deficiencies noted in #2 LP unit were: excessive wear on reduction gear pinion teeth and feathering on bull gear teeth from misalignment of bearings, deep pitting on one crank pin at center, heavy pitting on first and second stage pistons and slight scoring on first stage crank pin bearing white metal.

No material deficiencies were noted or reported in #2 HP unit except wear on reduction gears indicated by sharp tooth edges.

Boilers

10. The boiler plant consists of twelve Babcock-Wilcox express type, single uptake divided furnace double cased, separately fired superheater boilers. The water sides and fire sides of boilers No. 2A, 2B, 3B, 3A, 1B and 4B were open for inspection, and were being cleaned at time of inspection. The water sides of drums and tubes of above boilers were found to be in good condition. No scale was noted and only pitting of a minor nature in upper port of steam drums was observed. The fire side of tubes and drums were found to be clean and in good condition. The furnace refractory in all boilers inspected was found to be in general, in fair condition. The brick work in both the superheater and saturated fire boxes contained a

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coating of slag, and considerable spalling. It is estimated that a large percentage of the furnace refractory in these boilers will require renewal during the next regular Navy Yard overhaul. The only defect of a serious nature observed was the loss of chrome ore on the water wall stud tubes. The chrome ore on the dividing water wall stud tubes has eroded to the extent, that the studs and the entire surface of the side of tubes next to fire box are exposed, and in some areas as much as $\frac{1}{4}$ of the length of the studs has burned away. It is recommended that this defect be corrected prior to any full power steaming of these boilers.

Uptakes
and Smoke
Pipes

11. The uptakes and smoke pipes were found to be in good condition. Some of the uptake spaces were provided with bins, and were used for storage of material and spare parts. However in some cases the material was stored in such a manner as to constitute a hazard. It was noted that a large number of small studs and bolts were stored in such a manner, as to easily get adrift and reach blower intakes. It is recommended that all material that cannot be safely stored be removed from uptake spaces.

Blowers
Forced Draft

12. There are twenty-four Sturtevant Vertical, steam driven, type VX7 forced draft blowers installed. Blowers No. 4B-1, 3C-1 and 3B-1 were opened up for inspection. The bearings and bearing journals of No. 4B-1 were found to be in good condition. The white metal of the center bearing of No. 3C blower was found to be slightly scored along the edges, and the clearance was .010". The design clearance is .006. The bearing journal was in good condition. The center bearing of No. 3B blower was found to be slightly scored, the shaft journal slightly grooved, and the bearing

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clearance was .008". The ship reported that the operation of all blowers had been satisfactory, except No. 3C-2 and 1B-2. It was reported that these blowers vibrated at high speed. A work item was submitted to check these blowers for balance.

Fuel
Apparatus

13. All fuel apparatus was reported to be in good condition and no defects were noted by the Board.

Boiler
Feed Water
Equipment

14. No. 2 deaerating feed heater was open for inspection, and was found to be clean and in good condition. No defects were noted in any of the feed water equipment.

Distilling
Apparatus

15. This apparatus consists of twelve "Griscom Russell" evaporators divided into four, three unit groups for triple effect operation. Each unit group has a rated capacity of 40,000 G.P.D.

Examination of the first effect tube nests of #2 group disclosed no material deficiencies other than very light brittle scale on tubes, tube sheets, support plates and shell interior. The fact that this scale was very light coupled with the additional fact that no mechanical scaling had been performed during the period in which these units have been in service, indicated careful and efficient operation of the plant.

The condition of the various allied pumps is described in section 7 of the report.

Refriger-
ating Plant

16. Six "Carrier", vertical twin cylinder, 6 ton, freon compressors with allied auxiliaries comprise this plant. These units are designated as #5, #6, #7, #8, #9 and #10 respectively.

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#10 unit was opened for examination of internal parts by the Board. Deficiencies noted were: Slight wear on cylinder bores indicated by shoulder at bottom piston stroke, 2 compression rings and one wiper ring broken on one piston, discoloration of both piston pins and white metal of one crank pin bearing from apparent overheating.

Instruments
Mechanical
Measuring

17. Material of this general category was apparently in good condition with no deficiencies noted or reported other than a broken gauge line on #13 Fire and Flushing Pump, renewal of which, was in progress.

Repair
Equipment
Lifting
Jacking,
etc.
Portable

18. This equipment was adequate for all required purposes and in satisfactory condition. Items not in actual use were carefully stowed in designated locations.

Ship
Service
Generator
Turbines

19. This equipment consists of eight "General Electric" six stage, impulse type turbine units each driving a 1250 K.W. alternator with attached exciter through single helical reduction gears. These units are designated serially #1, A and B, #2, A and B, #3, A and B, #4, A and B respectively. The reduction gears of #2A, #2B, #3A and #3B were rendered accessible for examination by removal of inspection plates.

Uniform tooth contact between pinions and bull gears was apparent with no indications of wear in evidence. A uniform circumferential row of minute scars existed on the pinion and bull gear tooth tips of #3B but no resultant impairment of operating condition was discernible.

Circumferential scoring was present on the turbine shaft bearing contact surfaces of #2A and #2B at the exhaust ends and a similar condition

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existed on the generator shaft bearing contact surfaces of #2B. The bearing ~~was~~ white metal at these points although slightly rough, indicated no signs of requiring renewal.

No turbine casings have been lifted since the original installation of these units.

Repair
Shops

20. The machine tool components of the repair shops are: three "Reed Prentice" lathes, one "Lodge and Shipley" lathe, one "Milwaukee" milling machine, one "Rogers" turret lathe, one "Morris" radial drill, one "Peerless" hack saw, one sensitive drill, one tool grinder and one "South Bend" precision lathe.

All units were well maintained and in excellent operating condition.

Safety devices with the exception of abrasive deck treads were adequate.

Precision instruments were ~~instruments~~ well insured against damage or loss by careful stowage in lockers designated for that purpose.

Damage
Control

21. The arrangement of machinery, piping and valves in this vessel is considered excellent for damage control, and split plant operation. Model chart boards depicting lines and valves of the machinery piping systems are located in engine rooms for use in damage control and split plant operation.

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REPORT OF MATERIAL INSPECTION

OF

U.S.S. R. D. ROOSEVELT (CVA-42)

HELD 14 - 18 DECEMBER 1953

RETURN TO FILE ROOM
BY
BUREAU OF SHIPS
BOARD OF INSPECTION AND SURVEY

Original to: Chief of Naval Operations

Via: Bureau of Ships (*chief*)

Copies to: Chief, Bureau of Ordnance
Chief, Bureau of Aeronautics
Chief of Naval Operations (Op-43) 1
Bureau of Ships 2 (2) ✓
Bureau of Ordnance 1
Cdr. Naval Shipyard ~~Bremerton, Wash~~
ENSURVPAG 1
CINCLANTFLT 1
COMAIRLANT 1
COMAIRPAC 1
CINCPACFLT 1
CO, USS F D ROOSEVELT (CVA42) 1
BUAER 1

OPNAV FORM 4730-6 (REV. 6-52)

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Seventh	The Board finds Electronic Installation, Equipment and Spaces to be, in general, in good condition.
Eighth	The Board finds the Damage Control Installation, Equipment and Facilities to be, in general, in satisfactory condition.
Ninth	The Board found the Ordnance Installation in generally unsatisfactory condition as a result of inoperability of major equipment.
Tenth	The Board finds the Medical Installation, Equipment and Spaces to be, in general, in good condition.
Eleventh	The Board finds the Supply Installation, Equipment and Spaces to be, in general, in satisfactory condition.
Twelfth	The Board finds the Air Department Installation, Equipment, and Spaces to be, in general, in good condition.

III - GENERAL COMMENT

1. The USS F. D. ROOSEVELT (OVA-42) is an aircraft carrier, 968' overall length, 136' beam, 62,000 full load displacement, four screw, 212,000 SHP, geared turbine drive. The ship was constructed by the New York Shipyard and commissioned on 27 October 1945.
2. The last regular overhaul was from 16 February 1952 to 14 June 1952 at the Norfolk Naval Shipyard, Norfolk, Va. The last docking was from 29 March 1952 to 14 May 1952 at Norfolk Naval Shipyard. The ship had been underway 266 days since the last overhaul and not underway 268 days. The prospective date of the next regular overhaul is 7 March 1954, incident to conversion and modernization at Bremerton Naval Shipyard, Bremerton, Washington.
3. The last inspection by the Board of Inspection and Survey was held on 19 June 1949. The vessel has been placed in commission in reserve incident to conversion of the ship at the Bremerton Naval Shipyard, Bremerton, Washington. The vessel was assigned

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to the Atlantic Fleet for the past eighteen months and served two tours of duty in the Mediterranean of five (5) and six (6) months duration respectively.

The vessel suffered no war damage, has steamed approximately 309,000 miles since commissioning and about 100,000 miles since the last major overhaul.

IV - NAVIGATION INSTALLATION

General	The Board found the navigation installation in satisfactory condition.
Pilot House	The pilot house is satisfactory.
Open Bridge	This station is satisfactory except that it is understood that multiple reflections from the vertical windows interfere with navigation. A ShipAlt approves installation of sloping windows at this station.
Secondary Conn (Bat II)	(1) This station is satisfactory except as follows: The mechanical steering unit is stiff in operation and required overhaul. A machinery card covers this. (2) The station has no emergency exit door. It is recommended that a quick-acting armored door be installed in the forward bulkhead leading onto the catwalk. (3) The telephone communication from this station to the alidades should be paralleled by a voice tube system. This is covered in ShipAlt CVB 396.
Gyrocompass	The gyrocompass system was found to be satisfactory except that the stand for the starboard gyro repeater opposite Secondary Conn is missing and requires replacement before the ship gets underway.
Navigational Lights	The Board found that megger readings for the navigational lighting circuits were low.

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VII * MACHINERY INSTALLATION

General

1. The general condition of the machinery and boilers of the USS F. D. ROOSEVELT (CVA-42) taking into account recent operations and age was satisfactory. It was noted that the material readiness condition of the engineering department for the past year has been such as to allow very little preventive maintenance and periodic inspections of machinery. Blueprints pertaining to all machinery are indexed and on board and were approximately 95% complete. Missing prints were on order. Instruction books covering the operation and maintenance of these units were 99% on board. Missing books were on order. Items of both categories were systematically filed in the engineer's log room.

The machinery index, machinery history, current ship's maintenance project and engineer's log were examined and found to be in proper order and in accordance with current directives. It was quite evident from an examination of the machinery history of the recent past that preventive maintenance, routine opening of machinery for inspection and repairs had suffered considerably because of the operational demands made on the engineering department.

An inventory of machinery spares is in the process of being completed and indicates these items as being 75% complete. Requisitions covering the indicated shortages are being prepared and submitted. The last recorded full power run was attempted on 12 December 1952, at which time a speed of 32.3 knots was attained with an average of 201.6 RPM on all shafts. The ship was unable to attain maximum RPM (206) required for full power and it is believed the presently installed steam strainers cause too great a pressure drop and were a contributing cause combined with the inability of the boilers to produce rated superheat temperatures. The last major machinery overhaul was performed by the Norfolk Naval Shipyard, Norfolk, Virginia, during

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the period 29 March 1952 to 14 May 1952. The Ship has steamed approximately 309,000 miles since commissioning in October 1945.

The following major machinery derangements occurred during the past year:

- (a) Superheater tube failure in #2A boiler.
- (b) Main steam strainers #1 and #2 main engines had segments fracture from strainer and carry over into the turbines. A work item was submitted by the Board to repair the damaged blading, and investigate the design of these strainers with the end in view to reduce the steam pressure drop.
- (c) Shaft turning gear on #1 shaft carried away during locked shaft drill.
- (d) Generating tube failure #3A boiler.
- (e) #1 main reduction gear tooth tip cracked off on L.P. second reduction pinion.
- (f) Rear casing damage by fire box flame #2A boiler.
- (g) Generating tube failure in #2A boiler.

Work items were submitted to make permanent repairs as necessary to correct the above derangements.

The following machinery and equipment was open for inspection of internal parts. In general, this machinery opened did not indicate the necessity for major overhaul; however, it was evident that all machinery was in need of opening up for inspection, and replacement of worn parts. Under normal conditions, this would be accomplished by the ship's force and general work items were submitted to accomplish this work.

- (1) Boilers 1C; 2B; 2C; 3A; 4A; and 4B (watersides and firesides open with side panel and one superheater center panel removed);
- (2) #2 Distilling Plant pumps.
- (3) #1 Distilling Plant 1st effect tube nest.
- (4) 1B-2 Forced Draft Blower
- (5) 3B-1 Forced Draft Blower

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- (6) 4C-1 Forced Draft Blower
 - (7) 2A-2 Fuel Oil Service Pump
 - (8) 4A Fuel Oil Heater
 - (9) 4C Emergency Feed Pump
 - (10) #3 Fresh Water Pump
 - (11) #2 Fuel Oil Transfer Pump
 - (12) Smoke Stack Accesses to 1C; 2A; 3A; and 4B Boilers.
 - (13) 4A Main Feed Pump
 - (14) 4B Main Feed Booster Pump
 - (15) #4 Main Circulator Pump
 - (16) #7 Turbo Fire Pump
 - (17) 3A Lube Oil Service Pump
 - (18) #3 Bilge Pump
 - (19) #3 Cooling Water Pump
 - (20) 2B Main Condensate Pump
 - (21) 2B Auxiliary Condensate Pump
 - (22) 4A Auxiliary Circulator Pump
 - (23) #2 Auxiliary Feed Booster Pump
 - (24) #3 D.A. Tank
 - (25) #3 Chain Drive L.O. Pump
 - (26) Lube Oil Purifier
 - (27) #4 Cooling Water Strainer
 - (28) One spring bearing (Main Shaft #2)
 - (29) One spring bearing (Main Shaft #3)
 - (30) One spring bearing (Main Shaft #4)
 - (31) Lube Oil Strainer (Main)
 - (32) #1, 2, 3 & 4 Main Condensers
 - (33) #2A, 2B, 3B, 4A, 4B Auxiliary Condensers.
 - (34) #2, 3, & 4 Turbine Inspection Plates.
 - (35) #2, 3, & 4 Main Reduction Gears
 - (36) #3 H.P. and L.P. Turbine Thrust Bearings
 - (37) #3 H.P. and L.P. fwd journal bearings.
 - (38) #3 L.P. Thrust Bearing and fwd. journal bearing.
 - (39) #4 H.P. and L.P. Turbine, after journal bearing.
 - (40) Reduction Gear Insp. Plates #2A, 2B, 3A, 3B Generators
 - (41) 2A Generator Thrust Bearing & Turbine Bearings
 - (42) 2B Generator Turbine Bearing and Exciter Bearing.
 - (43) 3A Generator Exciter Bearing and Turbine Bearing.
 - (44) 3B Generator Turbine Bearing and exciter bearing.
 - (45) 2B generator turbine inspection plate

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Main
Engines

2. The main engines consist of four sets of General Electric cross compound turbines developing a total of 212,000 SHP at 540 pounds per square inch steam temperature and 825°F temperatures.

An inspection of the forward bearing of No. 2 high pressure turbine indicated a bright journal surface with .002 inch rounded grooving. The condensate slinger and oil seal surfaces were in good condition. The rotor surface aft of the bearing indicated a brown discoloration indicating lubricating oil leakage or heat coloring. The babbitt cap bearing was found in satisfactory condition although some scraper chatter marks indicated poor workmanship. Both thrust collar surfaces were dead smooth. The forward thrust shoes showed 65 to 70 percent burnished contact area. The after shoes presented a heavier contact averaging about 90 percent. The shoes were substantially free from circumferential grooving lines. Clearance under the oil retaining fins was measured and found to be .010" to .012" at the horizontal with .008" at the top. An examination of the after bearing of this unit indicated a large oil clearance due to lack of babbitt cap contact. The after journal presented a semi-bright appearance with .002" rounded grooving. The condensate slinger ring contained some surface and edge roughness but no recent abrasion or interference was indicated. The forward end of the coupling indicated a heavy tooth edge formation. The coupling clearances were excessive from wear and coupling should be refitted or replaced. Axial travel was found to be approximately $\frac{1}{8}$ inch. The coupling moved freely in a fore and aft direction. The top clearance under the oil fins was found to be .008" indicating negligible vibration. The cleanliness of the coupling assembly was good. The first row of blading viewed from the nozzle clearance opening presented a brownish black color. The forward shroud edge was found in good condition. The last row of blading was found to be intact and the inner edge of the shroud was free from deformation.

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The forward bearing of No. 2 low pressure turbine indicated .010" rounded grooving on the journal surface with heavy stoning marks and grinding chatter marks on its surface. The babbitt cap contained some abrasion marks at its after end. The journal is apparently being roughened from foreign material inclusion in the bottom half of the bearing. The bearing should be completely disassembled and cleaned and refitted at the next naval shipyard period. The thrust collars were relatively smooth on both surfaces. The forward shoes indicated an 85 percent contact. The after shoes were satisfactory as determined by edge inspection. The after bearing journal indicated a semi-bright appearance and its top bearing cap presented a smooth surface and bright silver color. The interior of the turbine casing contained considerable moisture and condensation due to steam leakage probably due to auxiliary exhaust leakage. The after blading as visible from the opening was found to be intact with edges and surfaces relatively free from erosion. The astern shroud band presented a faint bluish color. Stay rods were intact but contained some surface abrasion. Measurements on one of the top row of condensate tubes indicated a .003 reduction in wall thickness at the top. Blading was tested with hammer handle excitation and a good clear note resulted. A .002 feeler thickness blade could not be inserted at the blade roots. This turbine contains no internal condensate cooling spray as provided on the other two sister ships. Make up feed pipes with slotted openings were observed near the top of the tube bundles for make up feed use via the vacuum drag method.

In No. 3 high pressure turbine the rotor position indicator requires repairs and adjustment. The forward bearing journal presented a semi-bright color with rounded grooving of .002". The babbitt cap presented a bright silver color and indicated a carefully scraped fitting with a moderate contact near the starboard horizontal joint. Shims were found inserted between the bearing halves but their origin and purpose could not be ascertained. Thrust collars were smooth with approximately 25 percent

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contact on the forward shoes and 45 percent aft. Provision for radial expansion was obtained since .007" clearance was measured under the forward mounting bolts. The last stage blading was free from apparent defects. No balance weights could be found in the dovetail ring provided for this purpose. Moisture and condensation appeared in the turbine interior. It was reported that some casing leakage existed at the horizontal joint near the after end of the turbine. It was reported that a so called critical vibration existed in this turbine in 27 knot ship speed range.

The forward journal of No. 3 low pressure bearing contained grinding chatter marks with a bright metallic surface and .010" grooving at the forward end. Spherical seatings surface were good. Oil fin clearances measured .010" at the side and .023" at the top. This oil fin assembly should be refitted to reduce the top clearance. Both thrust collars were found to be smooth with 40 to 45 percent contact on the shoes. The after shoes were satisfactory as determined by edge inspection. The depth gauge readings showed some variation caused by the jaw type depth micrometers used for this purpose. These Brown and Sharpe instruments should be repaired or a more suitable type provided. The visible blading was found to be intact. Some moisture and condensation were observed. The entry edges of the last row ahead blading contained some water cutting roughness for a distance of about 1 1/2 inches from the tip. Due to the rounded inlet section at this point no difficulty is expected from the roughened surface.

The after bearing journal of No. 4 high pressure turbine presented a semi-bright surface with a multiple burnished band effect and negligible grooving. The top cap contained several cavities either due to blow holes or recesses from which foreign material had been removed. Clearances under oil fins were found to be .012" inboard and .010" outboard. The aluminum fin castings are more susceptible to wear than bronze castings as previously used. The coupling backlash clearances were measured and found

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to be .035", .045" and .037" which are becoming excessive. After clearances on coupling teeth were more reduced in that readings on .024" and .026" were obtained. The last row of blading appeared intact but some blade roughness was observed by mirror inspection of the preceding fixed blades. This turbine casing was last lifted in February 1953. Blading tightness was fair as determined by ringing test.

The after bearing journal of No. 4 low pressure turbine contained multiple burnished bands with negligible grooving and a bluish surface color. The top cap was found in satisfactory condition and the blue color previously noted on journal was definitely ascribed as a marking ink paint color. Coupling tooth clearances ranged from .034" to .036". Some vibration was reported to exist in the 18 to 22 knot range. Some of this effect may be structural vibration since it was previously necessary to install heavy bracketing for the air ejector assembly. As an index of possible turbine vibrations the oil seal clearances were found to be .015" at each side on the horizontal plane but only .009" at the top. The machinery history indicates that the bearing journal diameter was reduced below the design value due to construction damage. The bearing dimensions are consequently non-standard. The internal blading appeared to be intact. The after astern last row shrouding indicates a light blue color due apparently to steam temperature. On the ahead stage the entry edge roughness was observed to the same extent as on the other low pressure turbines. Heavy moisture and condensation was noted in the turbine interior. Shroud band inner edges were probed and found to be free from deformation.

Since No. 1 shaft was retained as the single ready standby unit, inspection of these turbine units were not conducted by Board in order to avoid a violation of their immediate readiness condition in any way. An item has been entered in the work list to provide for a subsequent inspection by

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ship's force (item 39a).

During the past year a deterioration and breakage of main steam line strainers occurred which resulted in damage to No. 1 and No. 2 high pressure turbines. These strainers were of the flat plate segmental type with the end of each arc segment welded to vertical ribs. A number of these segments carried away and were lodged in nozzles and found inside the turbines. Blading as far as the second stage was badly deformed and nicked on No. 1 high pressure turbine and damage was reported to extend to the third stage in No. 2 high pressure turbine. Existing photographs of resultant damage indicate the wisdom of blade renewal of these damaged rows (item 37s). Temporary repairs were made by lifting both turbines and smoothing and refinishing the blade edges in February 1953. The strainers were replaced with a heavier type of shell structure with large widely spaced radial holes backed by inner cylinder of heavy mesh. These unusual strainers appear to cause a pressure drop at full power steam flow which prevents the attainment of full power competition speed by 2 shaft RPM. The strainer design should be investigated and improvement made if possible. In justice to the present strainers, however, the operating logs indicate a moderate drop in the boiler superheat temperature which no doubt is also a contributing cause. When in drydock the propellers should be checked for uniformity of the design pitch and the integrity of the blade surfaces. Hull resistance due to a fouled bottom may also be a contributing factor. The ship was last docked 14 May 1952.

Records indicate that the four low pressure turbines have never been lifted since the construction period. In view of the extensive high power operation since the commissioning date of 27 October 1945 and recent damage incurred in the second stages of the low pressure turbines of a battleship having similar turbines, item 36s has been entered in the work list to raise the casings of at least two turbines during the forthcoming modernization period. If discrepancies are found there, the other two low pressure turbines

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~~casings should also be opened for further~~
~~examination.~~

No. 3 high pressure turbine was reported as having minor leakage at the horizontal casing joints under higher pressures in this after section (item 35s). The forward bearing of No. 2 low pressure turbine contains journal roughness and this bearing should be cleaned or refitted (item 42s). The forward mountings of No. 2 and No. 4 high pressure turbine are rigidly bolted down. Item 41s has been entered in the work list to provide freedom for the radial expansion of the forward section of these turbines. All thrust indicators for axial positioning of the rotors are worn and damaged and require repair and readjustment (item 46s). Four couplings to gear pinions are worn as indicated by high values of backlash and should be refitted or renewed as outlined under item 40s.

The thrust collar on No. 3 high pressure turbine was found loose while taking quarterly readings on 19 October 1952. The machinery history indicates that the nut was difficult to remove but facilitated by local heating. A new collar was installed. Further work in manufacturing a full sized nut is required under item 25s. Latest readings indicate satisfactory thrust clearances. The other thrusts should be carefully observed for the detection of similar lost motion.

The gland sealing steam regulators require rebuilding due to excessive wear on parts and present poor regulation. Item 17s has been entered in the work list for all four turbine regulators.

It was reported that carbon packing leakage is excessive at the present time on all four low pressure turbines and No. 3 high pressure turbine. Item 18s has been entered to provide for either refitting or renewal of these seals.

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<u>Pin Gauge Aft.</u>		<u>Pin Gauge Fwd.</u>	
Constant	8.603	Const.	8.619
Last Reading 7/28/53	8.608	Last Read. 7/28/53	8.620
Present	8.608	Present	8.620

#2 L.P. TURBINE AFTER END BRIDGE GAUGE READINGS-2/19/53

	<u>Const.</u>	<u>Last</u>	<u>Present</u>
TOP	.025	.027	.027
SIDE	.023	.023	.024

#2 L.P. NOZZLE CLEARANCE READINGS AFTER END

Orig. Constant	.290
Last read. 7/28/53	.297
Present	.297

Rotor jacked hard aft.

#2 L.P. PIN GAUGE READINGS AFTER END

Constant	8.603
Last read. 7/28/53	8.608
Present	8.608

#2 L.P. PIN GAUGE READINGS FORWARD END

Constant	8.619
Last read. 7/28/53	8.620
Present	8.620

#2 L.P. CLEARANCE READINGS FORWARD END

Orig. constant	.076
Last read. 7/28/53	.077
Present	.077

#2 L.P. TURBINE BRIDGE GAUGE READINGS FORWARD END-2/19/5

	<u>Constant</u>	<u>Last</u>	<u>Present</u>
TOP	.013	.014	.0135
SIDE	.021	.021	.0215

The main propulsion turbine journals indicated much less wear and grooving than found on other ships of the class. The journal and babbitt surfaces were generally of a bright silver color indicating excellent lubrication and care of the lubricating oil. Each engine room was provided with a well kept tool box which should serve as a first step to good self maintenance.

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The work recommended in this text and the items enumerated in the work list should upon their completion, place the main engines in a good condition. The main engines installation must be classed as unsatisfactory largely due to the inability to reach full power rather than upon the actual material condition as observed in this inspection. Due to the continuous hazard of blade fatigue, frequent examination as possible at the existing points for inspection should be conducted prior to the forthcoming modernization program to discover any new or latent defects in this respect.

Reduction Gears

3. The main propulsion reduction gears consist of four sets of General Electric double reduction, multiple pinion, double helical gears of conventional design.

An inspection of No. 2 reduction gear indicated some pressure areas at the forward end of the high speed pinion on the low pressure turbine side. These tooth surfaces should be relieved when an opportunity exists. The intermediate gears showed a partial ground glass finish with occasional pin point and particle spalling. The low speed pinions on the low pressure turbine side contained no significant markings with the exception of a few minor continuous foreign material lines. The turning gear was found to be in good condition. The low speed pinions on the high pressure turbine side showed some pressure pad effect on the after end of the after helix with occasional particle spalling. Some ends have been relieved more than others. The first reduction on the high pressure side showed a general ground glass finish with small particle spalling areas.

The first reduction of No. 3 gear set on the high pressure side indicated a ground glass finish with some pin point spalling and a slight active wear. The upper low speed pinion contained some particle spalling in localized spot areas. End relief was provided to a dimension exceeding normal

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practice. The bull gear indicated a light active wear. The upper low speed pinion on the low pressure side contained two foreign material lines. The high speed pinion indicated the growth of pressure pads at the after end of the forward helix. It was reported that one tooth had broken at the forward end of the forward helix and had been satisfactorily dressed down. The damaged tooth was not in the line of sight and the shaft could not be jacked over for a visual inspection due to the disassembly of turbine bearings. On this reduction an excessive tooth relief to the extent of 5/8 inch was observed on some teeth.

On No. 4 reduction gear the after end of the forward helix of the high speed pinion on the high pressure side contained no end relief whatever and contact extended to the very edge. Two foreign material lines were observed on the lower low speed pinion. Pressure lines were evident in the dedendum at the after end of the forward helix. Heavy stoning marks were visible on several teeth about four inches from the forward end of the forward helix. On the low pressure side the after end of the after helix of the upper low speed pinion contained crescent shaped pressure areas indicating an effective relief only at the pitch circle. The bull gear contained pressure pads centering on the pitch circle about 3/8 inches in length and 1/2 inch from the after end. The upper low speed pinion showed an interruption in the contact line about one inch in length and located about three inches from the after end of the forward helix. The first reduction train contained no significant tooth markings. While contact on the teeth of this gear assembly was not uniform throughout the chief concern should be in the elimination of the several end pressure areas.

No. 1 reduction gear was not inspected due to the requirements for examining a standby unit. Ship's force was requested to conduct a subsequent inspection.

All thrust collars and shoes normally provided at the forward end of the bull gear have been removed and the entire thrust is absorbed in separate shaft

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Ser 40M-5

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alley units. An item has been placed in the work to provide a gauge, pointer or indicator to show axial movement of the bull gear due to this arrangement in a manner similar to devices fitted on the other two carriers of this class.

Reduction gear bearings, first reduction thrusts and the integrity of gear spiders could not be examined at the time of inspection and their condition is unknown.

A perusal of the machinery history indicated that a broken tooth was found on No. 1 main reduction gear during a quarterly inspection by ship's force on June 22, 1953. This tooth was located on the after end of the after helix of the upper low pressure side low speed pinion. A conclusion reached at that time ascribed the cause to a deformation of the gear tooth end perhaps in assembly.

The machinery history also indicates a rather extensive series of gear tooth failures in 1949. An inspection of No. 1 main reduction gear disclosed five broken teeth on the low pressure turbine side on the intermediates. Six wiped bearings in this vicinity were renewed due to wiped thrust faces whose excessive axial clearance may have contributed to this tooth breakage. At this time No. 2 main reduction gear sustained two broken teeth in a similar way and one bearing was renewed. No. 3 had two broken teeth and No. 4 gear had one broken tooth. All gears were magnafluxed and broken tooth ends were ground and honed to eliminate interference. Viewed in retrospect, this damage may have resulted from bull gear axial movement or cubicle vibration carrying all gear members with it and imposing heavy loads on the end faced thrust bearings. A float indicator is recommended for all gears by item 45s.

Item 28s has been submitted by ship's force and is approved by the Board to make a selective inspection of all gear units during the modernization period. While observed gear tooth wear is only moderate there exist some discrepancies particularly in the

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formation of pressure areas at the ends of some teeth. Item 44s has been included in the work to refinish these described and other areas which may be found.

No main thrust bearing clearances have been determined since 1950. Readings at that time varied from .030 to .036 as compared to a design value of .020 to .050. It is known that heavy wear has occurred on the thrusts of similar ships and item 19s has been entered to inspect these units and check the dimensional valves. When thrust clearances become large at this point, damage to gear teeth may again result.

The machinery history indicates a casualty in March 1953 when the shaft brake slipped on attempting to lock No. 1 shaft. The turning gear motor and driving train was damaged and required replacement.

This inspection did not permit the examination of bearings, first reduction thrusts or intermediate spiders. Any such defects will be revealed by the work recommended under item 28s. An immunity from further tooth fractures is by no means assured.

Lubrication

4. The forced feed lubricating system for the main engines and reduction gears were in good material condition. The lube oil purifiers require an overhaul. Examination of the lubricant during inspection of the main lubricating oil strainers disclosed no apparent emulsification, or suspended foreign matter, and indicated viscosity within proper limits. A slight amount of coagulated paint flakes and lint, however, appeared in the bottoms of strainer baskets. Pertinent data contained in the last report of chemical analysis of lube oil indicated satisfactory condition. A work item was submitted to make an analysis of lube oil from each main pump.

Shafting and Propellers

5. Although inboard tail shaft and line shaft sections were in good material condition, some light rust was evident and present on exposed surfaces. Stern tube glands were tight. A soft patch has been applied to a broken gauge line nipple on the cooling water line to #1 shaft stern tube. A work item was

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submitted to repair this defect when ship is next drydocked. The upper half of one spring bearing was lifted on each of Nos. 2, 3 and 4 shafts. These bearings showed evidence of rust on the journals and this was attributed to condensation due to poor ventilation of these compartments and inherent sweating within these spaces. Although the internal parts of the main shaft thrusts were inaccessible for examination, records and reports indicated that filler pieces had been installed and shoes and collars inspected in May 1950. At which time, the following thrust clearances were taken and recorded:

(a) #1 shaft thrust	.030"
(b) #2 shaft thrust	.036"
(c) #3 shaft thrust	.036"
(d) #4 shaft thrust	.0295"

A work item was submitted to check these clearances and make an examination of shoes and collars. Stern tubes outboard tail shaft sections strut bearings and propellers were not examined inasmuch as the vessel was waterborne. Clearances of outboard bearings taken at last docking were inspected and appeared to be satisfactory. A work item was submitted to make repairs to outboard shafting as required by recent BuShips instruction. The ship reports excessive vibration in engineering spaces at speeds above 22 knots and this is attributed to the propellers which have been damaged. A work item was submitted to repair damaged propellers. Propellers are of the five (5) bladed type on No. 2 shafts and four (4) bladed type on shafts Nos. 1 and 4. Some trouble has been experienced with the chain driven shaft lube oil pumps. A work item was submitted to correct this deficiency on all four shafts. These pumps are located in the shaft alleys, just aft of the main shaft thrust bearings.

Main and
Auxiliary
Condensers

6. The water sides of four main and four auxiliary condensers were inspected and found to be clear and in good material condition. It was noted that two (2) tubes were plugged in No. 1 main condenser and one (1) tube plugged in No. 4

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main condenser. Other than one recent leak in August 1953, the ship has experienced no salt water leakage into the feed water system from condensers and this indicates that a good material condition exists in the main and auxiliary condensers.

Pumps

7. Items in this category were considered satisfactory except as follows:

- (a) Governors on fuel oil service pumps require overhaul.
- (b) Main feed pumps required inspection and repairs. No. 4 main feed pump requires a complete overhaul.
- (c) Main feed booster and auxiliary feed booster pumps require opening, inspection and repairs as required.
- (d) All evaporator pumps require extensive repairs and reconditioning.
- (e) Fire and flushing pumps require routine maintenance and some replacement of parts.
- (f) Three bilge pumps require overhaul and reboring of cylinders.
- (g) Main circulator turbine journals require machining and building up to design dimensions. Work items were submitted to open up, inspect and make necessary repairs to the pumps listed above.

Piping,
Valves and
Fittings

8. Material of this category was generally in unsatisfactory condition. A major portion of the valves in the engineering department leak; other deficiencies are listed below:

- (a) Open up, inspect and repair, as necessary, main steam strainer, all main units.
- (b) Several sections of fuel oil ballast pump piping requires replacement because of erosion.

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- (c) Pneumercator air lines on reserve feed and fresh water tanks require repair.
- (d) Bearing depth indicators on main engines require repair.
- (e) All bilge suction piping requires replacement in engineering spaces. This piping is in very poor condition.
- (f) Fire main cutout valves in engineering spaces leak to point firemain cannot be segregated.
- (g) Boiler steam stops and auxiliary stops leak.
- (h) Boiler safety valves require overhaul.

These deficiencies are traceable in a large part to the continuous demands for full power availability imposed on the engineering plant during the past year of operations in the forward area with insufficient upkeep periods to allow for maximum routine and preventative maintenance and performance of routine periodic opening and inspection of machinery and equipment.

Air
Compressors

9. This equipment consists of two "Worthington" 2 stage L.P. units, two "Worthington" 2 stage M.P. units and two "Handy-Tyne" four stage units. In general, the equipment was in good condition. The M.P. air compressors require routine overhaul and some piping associated with the H.P. air compressors requires replacement.

Boilers

10. There are twelve (12) Babcock and Wilcox express type, single uptake divided furnace, double cased, separately fired superheater boilers installed in separate firerooms. Six (6) of these boilers were open for examination of the fire and water sides. Steaming hours since last mechanical cleaning was as follows:

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<u>BOILERS</u>	<u>FIRESIDES</u>	<u>WATERSIDES</u>
1C	766.7 hrs.	1713.4 hrs.
2B	864.1 hrs.	864.1 hrs.
2C	639.7 hrs.	639.7 hrs.
3A	299.9 hrs.	1142.1 hrs.
4A	250.6 hrs.	1569.6 hrs.
4B	602.0 hrs.	602.0 hrs.

In general, the brickwork of all boilers is spalled, cracked and eroded by flame impingement. A work item was submitted to renew brickwork as necessary after water washing tubes. A heavy ash scale was observed on the lower passes of the superheater tubes. This must be removed to insure free passage of flame. Excessive ash scale was found on top the fireside of mud drums. An inspection of the watersides of boilers opened for inspection revealed the following: Slight amount of sludge in water headers, light pitting in rolled ends of generating tubes and downcomers, scale and rust deposits in the R.A. row of two (2) fireside row tubes near water drum at bend. It is recommended that these boilers be boiled out and this scale removed.

There was positive evidence of two (2) down-comer tubes leaking in boilers 1C and 4A, tube numbers D-9-2 and D-9-1, respectively. A work item was submitted to replace these tubes in view of the fact that rerolling on two occasions had the effect of increasing the leakage. It was noted that a one (1) inch generating tube was plugged in #2A boiler tube #RC-63 and one (1) in #2B boiler #1-20. A work item is submitted to replace these tubes.

Salinity, alcoholinity and hardness test data recorded during the last quarter of the operational period was examined and found to be satisfactory.

All safety devices were reported in good operating order including safety valves which were reported set in accordance with existing instructions on all boilers.

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Uptakes and
Smoke Pipes

11. The general material condition of uptakes and smoke pipes was good. Some of the uptake enclosures were provided with bins and were used for storage of material. A good deal of dust and dirt was observed on the decks and should be removed. It was noted that stack covers were in use on idle smoke stacks.

Blowers,
Forced
Draft

12. This equipment consists of twenty-four (24) Sturtevant vertical steam driven, type VX7 forced draft blowers; two units per boiler. Blowers #1B-2, 3B-1, and 4C-1 were open for inspection and condition of journal and bearings was satisfactory. Deficiencies reported in those units which were not opened for inspection were as follows:

- (a) Two spare bearings were wiped. Rebabbitting is required.
- (b) Reface #1 nozzle flange of #2C-1 blower in 2C fireroom.
- (c) Open up for inspection and repair as necessary all forced draft blowers (Note: annual inspection required by BuShips manual).
- (d) A work item was submitted to perform a complete overhaul on nine (9) blowers which the machinery history indicated showed the most wear and were least reliable.

Fuel
Apparatus

13. This apparatus was in good condition throughout with the exception of the following deficiencies:

- (a) A work item was submitted to clean all fuel oil heaters (Routine cleaning).
- (b) Several sections of fuel oil piping in bilges require replacement.
- (c) Routine inspection of all F.O. service pumps regulators repair and replacement of parts as necessary.

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(d) One cable on F.O. emergency trip broke during test and requires replacement.

Boiler Feed
Water
Equipment

14. This equipment was generally in good condition, with the following exceptions:

- (a) No. 1 D.F. tank had a light coat of grease on interior surfaces which should be removed.
- (b) A work item was submitted to inspect atmospheric vent valves to insure positive venting as required by BuShips Journal of July 1953, page 39. All tanks should be inspected for eroded spray valves.
- (c) A work item was submitted to inspect all 4DF tanks and make repairs as necessary.
- (d) Feed water testing equipment was found to be in excellent condition and adequate for this type vessel.

Distilling
Plant

15. This apparatus consists of twelve (12) Griscom Russell evaporators divided into four three-unit groups for triple effect operation. Each unit group has a rated capacity of 40,000 GPD.

Examination of the tube nests of the units, pulled for inspection disclosed scale adhering to the tubes about 1/16" thick. Cold cracking of scale is accomplished every day while in operation and indicated good results. A continuous starch feed system is installed and is used. A work item was submitted to acid clean tube nests. The condition of the various allied pumps in this apparatus is as covered under section on pumps.

Refrigerating
Plant

16. Six "Carrier", vertical twin cylinder, 6-ton, freon compressors with allied auxiliaries comprise this plant. None of these units were open for inspection as they were in operation. No defects were noted or reported and the machinery history indicates excellent material condition.

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Instruments
Mechanical
Measuring

17. Material of this general category was in good order except as follows:

- (a) Routine work items were submitted to test pressure and vacuum gauges incident to the conversion.
- (b) Depth micrometers on main engines bent and barrels not accurate.
- (c) Pneumercator air lines to reserve feed and fresh water tanks require replacement.
- (d) Two fresh water meters require calibration and repairs.
- (e) Boiler and main steam line gauges require calibration and repairs.

Repair
Equipment
Lifting
Jacking

18. This equipment was adequate for all required purposes and in satisfactory condition. Items not in use were stored or stowed in designed locations.

Ship's
Service
Generator
Turbines
and Gears

19. This equipment consists of eight (8) G.E. six-stage, impulse type turbine units, each driving a 1250 KW alternator with attached exciter through single helical reduction gears.

Uniform tooth contact between gears with some indication of wear was observed in the form of scoring. The bearing journals of #2A and #4A showed signs of scuffing of the metal and require dressing and re-fitting to bearings.

The turbine casings have not been lifted for the past five (5) years and lifting of these casings for inspection of rotors is highly desirable.

Safety devices were adequate and overspeed devices were reported set to design specifications and in proper working order.

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7 January 1954

Smothering
Apparatus

20. This apparatus all of which is installed in boiler casings and fire room bilges was apparently in reliable condition, and installed in accordance with existing directives.

Repair
Shops

21. The machine tool components of the repair shops are: Three Reed Prentice lathes, one Lodge and Shipley lathe, one Milwaukee milling machine, one Rogers turret lathe, one Morris radial drill, one Peerless hacksaw, one sensitive drill, one tool grinder and one South Bend Precision lathe.

Safety devices were adequate. Precision instruments were well insured against damage or loss by careful stowage in lockers.

The following deficiencies were noted:

- (a) Additional support and strength members are required under the large lathe to eliminate vibration and insure accurate work.
- (b) It is recommended that a suitable shaper be installed in this class ship.

No repairs were requested on shop machines and it was reported that machinery is in excellent condition.

Damage
Control

22. The arrangement of boilers and machinery is permissive of split plant operation and the emergency isolation of individual machinery units. Model chart boards analogous to machinery, piping and valves were strategically located throughout the machinery spaces. Some of these were damaged and a work item was submitted to replace those damaged.

NAVSHIPYDNOR

DATE

USS FRANKLIN D. ROOSEVELT
(CV3-42)

DEPARTURE REPORT
PARTS I & II

(Scheduled Overhaul - 30 March 1950 through 8 September 1950)

Arrived at Yard	30 March 1950
Work Started	30 March 1950
Completed	8 September 1950
Departed	8 September 1950

CNO
BuShips (In trip)
BuAir
BuOrd
ComAirLant
ComNavShipYdNYk
CO USS FRANKLIN D. ROOSEVELT

Copy to:
212
242
259
239
125
856

NORFOLK NAVAL SHIPYARD
PORTSMOUTH, VIRGINIA

OpRep 41-24

NAME OF VESSEL

F. D. ROOSEVELT

BUREAU OF

Ships (Hull)

PART I

WORK RELEASED

DATE WORK STARTED

30 March 1950

DATE OF FINAL COMPLETION

8 September 1950

Serial No.	Job Order Number	Brief of Work and Costs	Remarks
		Account #14122 ComAirLant Allot. MBS #10145/50 ComAirLant Allot. S&F #01145/51	
	8224 (Cont)	scrape and sand decks and bright work, resecure guard rail sockets, putty up, glaze hull and refinish boat inside and outside and replace boat in water for return to Vessel.	
	Expd.	L-1142.86 M-198.03 T-1340.89	APA Mtl. 39.00
46	8228	Modification of LCPL Boat Skid to accommodate 35' M.B.: Manufacture and install boat skid saddles and pads on LCPL boat skit to conform to underbody of 35' motor boat. Remove temporary support blocks installed by Ship's Force.	Comp. 8-15-50
	Expd.	L-867.93 M-253.62 T-1121.55	APA Mtl. 13.80
47	8358	Vickers Hydraulic Variable Speed Pumps for No. 1, 2 & 3 Airplane Elevators (11) Pumps and Safety Stanchion for No. 1 Elevator - repairs to; Open up the subject pumps, make examination, renew worn and defective parts, make repairs and adjustments found necessary to place in a satisfactory operating condition and test. Remove damaged safety stanchion from No. 1 elevator, deliver to shop and renew. When completed, reinstall.	Comp. 8-15-50
	Expd.	L-4431.97 M-122.17 T-4554.14	APA Mtl. 1569.22

Section 647-5012

CVB41/147(647-5012)

CVB42/147

For: Worthington Pump & Machinery Corp., Harrison, N.J.

VIA: INSPECTOR OF NAVAL MATERIAL, BUREAU, N.J.

6-NOV-1946

Subj: Pump, Main Feed.

Ref: (a) CG USS MITCHELL (CVB41) ltr. 19-3/147, Serial 2060 of 4 Oct 1946 to ComSALANT.
(b) CG USS FRANKLIN D ROOSEVELT (CVB42) ltr. CVB42/147 Serial 700 of 6 Sept 1946 to BuShips via ComSALANT and ComSALANT.
(c) ComSALANT ltr. 147 and 19-3/147 Serial 2060 dated 12 Sept 1946.
(d) ComSALANT ltr. 147 and 19-3/147 Serial 2060 dated 11 Oct 1946.
(e) Summary of
CVB41-14700-17 of Main Feed Pump Section Assembly

Encl: (H-)
(1) Copy of ref. (a)
(2) Copy of ref. (b)
(3) Copy of ref. (c)
(4) Copy of ref. (d)

1. The Bureau is informed by references (a) and (b) that water in excess of one quart per day accumulates in the lubricating oil sump of subject pumps installed in USS MITCHELL (CVB41) and USS FRANKLIN D ROOSEVELT (CVB42). This condition is commented on in references (c) and (d). It is believed that this water enters the lubricating oil system by way of leakage along the pump shaft which is sprayed by centrifugal force against the thrust bearing cover through the space between the thrust bearing cover and oil flinger referred to as parts No. 145 and 147 respectively on reference (c). This leakage is considered an important factor in the abnormal wear of thrust and radial bearing on the subject pumps.

2. Similar difficulties have been reported from CVB Class Carriers, the feed pumps being of similar construction

Section 847-5812

CV341/347(847-5812)
CV342/347

DP/40
11/4/48

to those on the subject vessel. In addition to leakage through the stuffing box packing, leakage also occurs between the shaft sleeve and the shaft. This leakage, on some vessels, was of such magnitude that sheet metal guards were installed to protect surrounding equipment from the spray. Installation of these guards caused a marked increase in the quantity of water found in the lube oil. This is taken as a definite indication that water enters the lube oil system at the point indicated in paragraph 1 above.

3. It is considered that this is a design deficiency which requires corrective action. Comments and recommendations are requested.

R. L. Swart
By direction of
Chief of Bureau

Copy to:
ComAirLant
ComUSNAVY PAC Atlantic
IN 100-417 AX (CV341)
IN 100-417 AX (CV342)

5812

CV41 Class/647(647-512)

FJS/rs
6/28/43

JUN 30 1943

From: The Chief of the Bureau of Ships
To: The Supervisor of Shipbuilding, CON, Newport News, Va.
Subject: Aircraft Carriers CV41, 42 - Diesel Generator Salt
Water Booster Pump, Warren Steam Pump Co., Manufacturer.

References:

- (a) BUSHIP, Newport News, ltr. CV41-44/247 of 7 June 1943 to BUSHIPS.
- (b) HNSARD Co. ltr. 439/144-3 of 1 June 1943, to BUSHIP, Newport News.
- (c) Warren Dwg. B21-1631; BUSHIPS Dwg. CV41-347 3-39
- (d) " " B21-1632, " " " " 40
- (e) BUSHIPS ltr. 647(3647)(330) BNSB/27-11 of 15 June 1943 to Various Activities.

1. Receipt is acknowledged of references (c) and (d), forwarded with references (a) and (b).

2. The omission of impeller wearing rings and a shaft sleeve is satisfactory to the Bureau provided that the shaft material is nickel-copper alloy or nickel-copper-aluminum alloy, attention being respectfully invited to reference (a).

3. The Bureau also suggests that in the table of characteristics on reference (c) "DC" be corrected to read "AC."

Copy to:
DNK, Hartford

B. P. Ward
By Direction of
Chief of Bureau

512

BUREAU OF SHIPS
NAVY DEPARTMENT
WASHINGTON, D. C.

SPEEDLETTER

15 JUN 21 42

SPEEDLETTER

(USED IN LIEU OF A DESPATCH OR MAILGRAM) MD/joJ

FILE No. CVB41 Class/347(512)	NON-CLASSIFIED X	RESTRICTED	CONFIDENTIAL	DATE
TO (Action): SUPSHIP, NEWPORT NEWS			COPIES TO: COM NYNYX 647 603	

(Use despatch phraseology)

RE REQUEST FOR IMPROVED DELIVERY DATES ON DELAVAL FUEL OIL
PUMPS FOR CVBS X THE FOLLOWING SCHEDULE CANNOT BE IMPROVED
WITHOUT SERIOUS INTERFERENCE WITH OTHER NAVY REQUIREMENTS:

CVB41	PROMISED JULY 1944
CVB42	PROMISED JULY 1944
CVB43	PROMISED NOV 1944

E. G. Kintner, Jr.
By direction of
Chief of Bureau

Signed

Originator's
Telephone Branch No. **2549**

BUREAU OF SHIPS SPEEDLETTER

E. G. KINTNER, JR.
By direction

NOTE TO RECIPIENTS OF THIS SPEEDLETTER.—The purpose of this form is to combine the advantages of despatches—streamlined form and phraseology, plus quick action by the recipient with the economy of transmission by airmail.

SPEEDLETTERS should *not* be handled by the Naval Communication Service at either originating or receiving office.

CVB42/846(L-21-30-34)(77)

From: Commandant NY New York
To: Foster Wheeler Corporation

Via: Assistant Inspector of Machinery, USN, Carteret, N.J.

Subj: Aircraft Carrier CVB42 - Main Condenser, Contract No.
Hobs-1049 - General Electric Company, Contractor - Foster
Wheeler Corporation, Manufacturer

Refs:

- | (a) | F.W.Corp. ltr. W-12524-7 dated 25 August, 1944 | | | | | | | | | |
|---------------|--|---------------|--------------|------|--------------|--------------------|---|---------------|--------------------|---|
| | <table border="0"> <tr> <th>F.W. Plan No.</th> <th>BuShips Plan</th> <th>Alt.</th> </tr> <tr> <td>(b) N-18658F</td> <td>CVB42-84601-328772</td> <td>4</td> </tr> <tr> <td>(c) WH-28149F</td> <td>CVB42-84601-328799</td> <td>3</td> </tr> </table> | F.W. Plan No. | BuShips Plan | Alt. | (b) N-18658F | CVB42-84601-328772 | 4 | (c) WH-28149F | CVB42-84601-328799 | 3 |
| F.W. Plan No. | BuShips Plan | Alt. | | | | | | | | |
| (b) N-18658F | CVB42-84601-328772 | 4 | | | | | | | | |
| (c) WH-28149F | CVB42-84601-328799 | 3 | | | | | | | | |
| (d) | Comdt. NY ltr. CVB42/846(L-21-30-31-34)(76) dated
18 Aug. 1944 | | | | | | | | | |

1. Plans references (b) and (c) received 30 August, 1944 with reference (a) have been checked to comply with the request in reference (d), and are approved.

J. M. ROBERTS
By direction

cc:
BuShips
I.M. Schenectady
General Elec. Co. Schenectady
(Att: Mr. Rask)
Mr. R.A. Williamson, General Elec. Co.
870 Lex. Ave. N.Y.C.
Foster Wheeler Corp. Washington, D.C.
(Att: Mr. Carleton)
SupShip. Newport News

9070213

UNITED STATES NAVY YARD
NEW YORK, N.Y.

241

C

CVB42/346(L-21-30-31-34)(81)

07 14

From: Commandant
To : Foster Wheeler Corporation
Via : Assistant Inspector of Machinery, USN, Carterat
Subj: Aircraft Carrier CVB42 - Gland Exhaust Condenser for
Main Turbines - Contract No. 1049, General Electric
Company, Contractor - Foster Wheeler Corporation, Manu-
facturer

Refs: (a) F.W. Corp. ltr. W-12524-31 dated 6 June, 1944
(b) F.W. Corp. Plan NH-26159-B, BuShips Plan CVB42-
94602-32594A, Alt. C

1. Plan reference (b) received 10 June, 1944 with reference
(a) has been checked and is approved subject to the receipt of
detail plans and the following comments:

(a) Performance data should be furnished as required by the
General Specifications for Machinery, subsection 846-1, para-
graph e-1.

(b) In view of the fact that this Yard does not have complete
piping arrangement plans of the gland exhaust system, comment
is withheld on the installation features pending receipt of the
arrangements from Newport News Shipbuilding and Drydock Company.

cc:
BuShips
I.M. Schenckelady
G.E. Co. (Att: Mr. Bask)
G.E. Co. 570 Lexington Ave., N.Y.C. (Att: Mr. Williamson)
F.W. Corp. Washington, D.C. (Att: Mr. Carleton)
SupShip. Newport News, Va.

J. W. ROBERTS
By direction

7010526

CVB41/class/546	512
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NEWPORT NEWS SHIPBUILDING AND DRY DOCK COMPANY

OUR REFERENCE
439/1442

NEWPORT NEWS VIRGINIA February 24, 1943

Supervisor of Shipbuilding, U.S.N.,
Newport News Shipbuilding & Dry Dock Company

SUBJECT: Aircraft Carrier CV41 - Centrifugal Pumps

REFERENCE: (a) Preliminary Specifications for Propelling
Machinery for CV41-44, dated January 4,
1943, Section S47-2

Dear Sir:

1. We are ordering the auxiliary cooling water and distiller plant pumps from the Warren Pump Company, who propose to supply apparatus approved for CV9 class carriers and DD421 as listed below.

2. We request your extension of approval of the following CV9 class and DD421 class plans for CV41-42, subject to minor modifications on plans which are to be submitted later:

<u>Warren's No.</u>	<u>Bu.No.</u>	<u>Title</u>
BS-993	DD421-S47-0145	Aux. Machinery Cooling
CV41-5801-2-1398	CV9-S-5801-17	Dist.Cond.Circulating
BS-1399	-18	
BS-1436	-44	Dist.Cond. Condensate
BS-1437	-45	
BS-1438	-46	
BS-1439	-47	
BS-1396	-21	Dist. Fresh Water
BS-1397	-22	
BS-1402	-19	Evaporator Feed
BS-1403	-20	
BS-1405	-38	Evaporator Brine Overboard
BS-1406	-39	
BS-1407	-40	
BS5-1421	-42	1st Effect Tube Nest Drain
4-1422	-41	
5-1423	-43	3020555

Please add Bureau numbers to the above list and return one copy to us.

Yours very truly,

NEWPORT NEWS SHIPBUILDING & DRY DOCK COMPANY

EGR:KR-7

By:

JPE

5 carbon duplicates herewith

F. R. Benson,
Chief Engineer

AC (Action):

(USED IN LIEU OF A DESPATCH OR MAILGRAM)

SPEEDLETTER

SPEEDLETTER

BY FILE NUMBER AND DATE

SPEEDLETTER

SPEEDLETTER

(USED IN LIEU OF A DESPATCH OR MAILGRAM)

FILE R-NY3-2-94854/45Y ((M)-26-31)	NON-CLASSIFIED X	RESTRICTED	CONFIDENTIAL	DATE 14 MAR 1964
TO: (Action) BUSHIPS (CODE 660T3 PORTER)		COPIES TO:		

(Use despatch phraseology)

ENCL.: (A) - REQ. NY3-2 SUNDRY #94854/45Y, ONE COPY.
(H/W)

UR NTX 111705. GENERAL ELECTRIC REQUISITION NUMBERS ON ORDER
NY3-2 SUNDRY 94854/45Y, L.O. HEATER AND CONTROL CVB42, ARE
XZN 163194 AND XZN 163194-1. AS FURTHER AID IN EXPEDITING
DELIVERY OF ITEM 2, AN ADDITIONAL COPY OF THE ORDER IS ENCLOSED.

3160323

W.H. Burtis
W.H. BURTIS
By direction